

OVERVIEW OF ANEMIAS

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Advanced Institutional APPE

OBJECTIVES

Review the definition and different types of anemia

Identify the signs, symptoms, and lab abnormalities associated with each anemia

Understand the labs associated with iron overload

WHAT IS ANEMIA?¹

Definition according to the World Health Organization

- Men: Hgb <13 g/dL
- Women Hgb <12 g/dL

Types of anemia

- Iron Deficiency Anemia (IDA)
- Vitamin B12 Deficiency Anemia
- Folate Deficiency Anemia
- Anemia of inflammation (& others)

PERTINENT LAB VALUES¹

MCV (80-100 fL)

- Average volume of RBCs
- Normocytic, macrocytic, or microcytic

MCH (27-32 pg)

- % volume of Hgb in an RBC

MCHC (32-36%)

- Weight of Hgb per volume of RBCs
- Hgb/Hct

Retic (0.5-2%)

- Production of immature RBCs
- Normal: 1%
- <1% = decreased RBC production
- >1% = blood loss

IRON STUDIES¹

Serum iron (50-160)

- Concentration of iron bound to transferrin

TIBC (240-425 mcg/dL)

- Iron binding capacity of transferrin

Tsat (20-50%)

- Ratio of serum iron to TIBC

Serum ferritin (30-250 ng/mL)

- Amount of stored iron in the liver, spleen, and bone marrow cells

GENERAL ANEMIA SIGNS & SYMPTOMS²

Fatigue

Dizziness

Weakness

Vertigo

SOB

Tachycardia

IRON DEFICIENCY ANEMIA (IDA)

Presentation¹

- Glossal pain
- Pica
- Pagophagia

Lab findings¹

- ↓ Hgb, Hct, MCV, MCHC
- Iron studies
 - ↓ Serum iron, T_{sat}, serum ferritin**
 - ↑ TIBC

Treatment³

- PO
 - ferrous sulfate, gluconate, or fumarate
- IV
 - Ferric gluconate
 - **Iron dextran**
 - Iron sucrose

** Earliest sign and best indicator for IDA

VITAMIN B12 DEFICIENCY ANEMIA

Presentation¹

- Numbness/paresthesia
- Vision changes
- Memory impairment
- Depression
- Peripheral neuropathy

Lab findings¹

- ↓ Hgb, Hct, retic, WBC, plt, serum B12
- ↑/↔ MCV
- ↔ MCH, MCHC
- ↑ MMA, homocysteine

Treatment^{1,4}

- Cyanocobalamin
 - PO: 1-2 mg qd
 - IM: 1 mg qd, then q weekly, then q monthly

FOLATE DEFICIENCY ANEMIA

Presentation¹

- Irritability
- Personality changes
- Memory impairment
- Depression

Lab findings¹

- ↓ Hgb, Hct, WBC, retic, plts, serum & RBC folate
- ↔ MCH, MCHC, B12
- ↑ MCV, Homocysteine

Treatment^{1,5}

- Folic acid 1 mg po qd

ANEMIA OF INFLAMMATION¹

Diagnosis of exclusion

Occurs in response to stimulation of cellular immune system by underlying conditions

Seen in patients with chronic diseases that last >1-2 months

Can use ferritin level to rule out IDA

Treatment: treat underlying disease state, pRBC, ESA, iron (if deficient)

IRON SUPPLEMENTATION^{1,3}

Oral therapy

- Fe sulfate (20-30% Fe)
- Fe gluconate (12% Fe)
- Fe fumarate (33% Fe)
- Adverse effects: constipation, nausea/abdominal pain
- Drug interactions with cations, PPI, H2RA, FQ, tetracyclines, levothyroxine

IV therapy

- Ferric gluconate (Ferrlecit)
- Iron dextran (INFeD)
- Iron sucrose (Venofer)
- BBW: iron dextran
- Adverse effects: hypotension, iron overload (\uparrow LFTs, ferritin >800 , tsat $>50\%$)
 - Reverse iron overload with chelators

IRON OVERLOAD⁶

Complications

- Liver damage/ cirrhosis
- Islet cell damage
- Diabetes
- Hypothyroidism
- Hypogonadism

Labs

- MCV (\leftrightarrow)
- Serum Fe (\uparrow)
- Ferritin (\uparrow)
- TIBC (\downarrow)
- Transferrin (\downarrow)
- T_{sat} (\uparrow)

Treatment

- Deferoxamine (IV)
- Deferasirox (IV)
- Deferiprone (PO)

WHO NEEDS IV IRON?

CJ is a 78 yo female hospitalized due to SBO and requires surgery.
PMH: constipation

- Labs & Iron studies
 - Hgb: 6.1; Hct: 18
 - MCV: 110; MCH: 30; MCHC: 34
 - Serum iron: 90
 - TIBC: 320
 - Tsat: 30
 - Serum ferritin: 90

GP is a 45 yo male hospitalized for fatigue and dizziness. PMH: colon cancer

- Labs & Iron studies
 - Hgb: 5.3; Hct: 16
 - MCV: 65; MCH: 23; MCHC: 20
 - Serum iron: 30
 - TIBC: 600
 - Tsat: 15
 - Serum ferritin: 15

THE BOTTOM LINE

A consult or order for IV iron is placed

- What do you look for?

CBC, iron studies, prior iron replacement

- What do you do if iron studies are not ordered or pending?

If pending, you can wait. If none ordered and patient has not received during hospitalization, dose IV iron

- Check ferritin, TIBC, tsat, serum iron, prior iron replacement (both IV or PO)

QUESTIONS?



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